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(72) Inventor: Van der Schoot, Jelle
Spinkatstraat 9
NL-7121 AL Aalten(NL)

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(74) Representative: Smulders, Theodorus A.H.J.,
Ir. et al
Vereenigde Octrooibureaux Nieuwe Parklaan
107
NL-2587 BP 's-Gravenhage(NL)

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(71) Applicant: AWETA B.V.
Burg. Winkellaan 3
NL-2631 HG Nootdorp(NL)

(54) Orienting mechanism for orienting fruit, for example.

(57) This invention relates to an orienting apparatus for orienting round or approximately round articles (1), for instance fruit, comprising two parallel rollers (12) extending obliquely upwardly and rotating in the same direction, and a chain (3) with conveying elements, arranged at the rollers and extending obliquely upwardly, wherein each conveying element consists of a holder (8) formed by an annular cup (9) in which a ball (10) is mounted. The ball may be rotatably mounted on a horizontal bearing pin (11) in the holder, whereby a quick orientation can be accomplished.

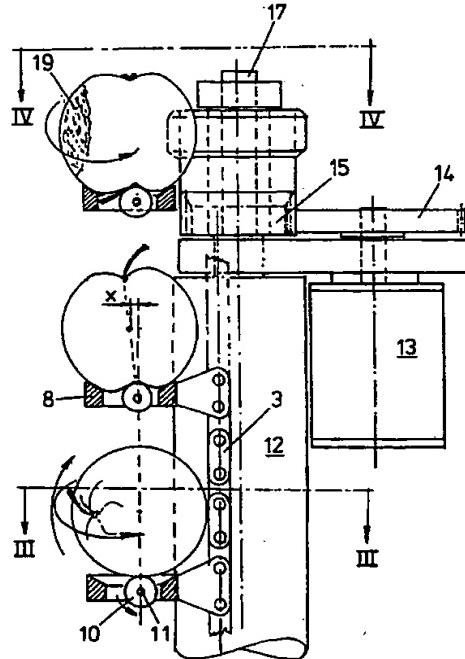


FIG. 2

ORIENTING MECHANISM FOR ORIENTING FRUIT, FOR EXAMPLE

This invention relates to an orienting mechanism for orienting round or approximately round articles, such as fruit, comprising two parallel rollers extending obliquely upwardly and rotating in the same direction, and a chain with conveying elements, arranged at the rollers and extending obliquely upwardly.

In such an apparatus as known from European patent application 0.332.477, the conveying elements mounted on the chain each consist of a pin mounted on the chain and driven for rotation, the top end of said pin being provided with a spherical member. Thus the possibility is created that the products rotating about their one axis under the influence of the rotating rollers can also be moved about an axis perpendicular thereto, in such a way that the fruit is oriented, i.e. at a certain moment the fruit has one of its hollows in alignment with its core coming into contact with the spherical member.

Not only is this apparatus relatively complicated, but also, after the desired orientation described above has been achieved, the product may easily become disoriented, because the product remains in contact with the rollers and the driven spherical member.

It is an object of this invention to overcome the drawbacks mentioned.

To that effect the orienting mechanism is characterized in that each conveying element consists of a holder formed by an annular cup in which a ball is mounted. Thus the article to be oriented, after being oriented, will sink over the ball onto the holder and be carried along exclusively by the holder.

Thus, it is not only accomplished that the oriented products remain retained in their position, but also a considerably simpler apparatus is obtained.

A further improvement is obtained when the ball is rotatably mounted on a horizontal bearing pin. Thus it is ensured that the product is oriented as quickly as possible and in the proper way.

The invention is further characterized by steps for discontinuing the contact between the fruit and the rotating rollers after orientation. These steps concern a proper arrangement or distancing of the ball relatively to the rollers.

A further step comprises the eccentric arrangement of the ball in the annular cup, but the discontinuation contemplated may also be accomplished by a construction with the roller side of the cup being raised relatively to the remaining portion of the cup.

In further elaboration of the invention, when a

bloom orientation is contemplated after orientation of the centreline of the core, the upwardly extending chain with holders can be stopped temporarily, whereafter, by means of a separate servo drive and at least one friction wheel, the fruit is rotated about its centreline before a camera until the proper position is achieved.

Each friction wheel may be provided with a hollow, so that when the fruit is being brought or has been brought into the proper position before the camera, no collision with products can occur.

Owing to the fact that the apparatus according to the invention does not require the use of driven spherical members, a considerably simpler apparatus is obtained while, moreover, in virtue of the features described the product to be oriented, after being oriented, sinks over the ball and thus comes clear of the rollers, so that disorientation is impossible.

For the sake of completeness, reference is made to European patent application 0.056.790, which discloses a similar apparatus as is described in European patent application 0.332.477 referred to above, with the understanding that in that apparatus the products to be oriented move downwards along the rollers under the influence of their weight, as contrasted with said European application and the present application.

One embodiment of the orienting apparatus will now be further explained and illustrated with reference to the accompanying drawings, in which:

Fig. 1 is a schematic side view of an orienting apparatus according to the invention;

Fig. 2 is an enlarged detail of the apparatus of Fig. 1;

Fig. 3 is a sectional view taken on the line III-III of Fig. 2; and

Fig. 4 is a view taken on the line IV-IV of Fig. 2.

Referring to the drawings, an orienting apparatus for orienting round or virtually round products such as apples 1 comprises a frame 2, shown only in part. Arranged in frame 2 is a chain conveyor 3 trained over chain wheels 4.

Fruits to be oriented - apples 2, in this case - are supplied via a conveyor 5 and via an intermediate plate 6 successively transferred to a holder 8 of the chain conveyor.

As appears more particularly from Fig. 2, each holder consists of an annular cup 9 with a spherical element 10 provided therein. The element 10 is rotatably mounted on a pin 11 whose centreline extends in a plane parallel to the plane of transport. Arranged at the chain conveyor are rotatable rollers 12 extending obliquely upwardly. The rollers 12 are

rotated in the same direction via means that are not shown.

The position of the apple after being deposited from the conveyor 1 onto a holder 9 is designated A1. In this position the apple will be rotated in two mutually perpendicular directions due to its being in contact with the rotating rollers 12 and the spherical element 10.

As soon as the apple has reached the position designated A2, the apple will roll back slightly over the holder (Fig. 2; distance x), i.e. the apple will come clear of the rollers 12 and not be rotated anymore, i.e. will remain in the position it has reached by then.

In this position the oriented apple along with its holder reaches the position designated A3, where the chain conveyor is stationary for a short interval. At that time a servo motor 13 is operated which rotates friction rollers 16 via gear wheels 14 and 15, which friction rollers 16 are mounted for free rotation on the projecting portion of roller shafts 17.

Then, by means of a colour camera 18 shown in Fig. 1, the highest intensity of the bloom colour 19 is determined, whereafter the servo motor stops automatically. The whole can be constructed in such a way that each time a maximum intensity is determined - based on the bloom's fading further on - the colour camera causes the servo motor to make a slight reverse rotation, so that the portion of greatest colour intensity is precisely in facing position.

To avoid any disturbance of the position of the apple upon its entering the position designated A3, the friction rollers may be provided with a hollow 20.

Just beyond the colour camera the apples can be taken off by a take-off mechanism 21 (see Fig. 1; for instance, a vacuum-operating suction pad system) and in that position be supplied to a packaging mechanism (not shown).

Whenever, by whatever cause, any apples that were supplied have not been oriented, they can be conveyed further to a removal station 21, a simultaneously rotating disc with pockets providing support in the bends.

It will be clear that a great number of modifications are conceivable without departure from the invention.

Claims

element consists of a holder formed by an annular cup in which a ball is mounted.

2. An apparatus according to claim 1, characterized in that the ball is rotatably mounted on a horizontal bearing pin in the holder.
 3. An apparatus according to claim 1 or 2, characterized in that the two rollers are provided with means for friction relative to the surface of the fruit.
 4. An apparatus according to claim 1, 2, or 3, characterized by means for discontinuing the contact between the fruit and the rotating rollers after orientation.
 5. An apparatus according to claim 4, characterized in that the discontinuation of the rotation of the fruit is accomplished by an eccentric arrangement of the ball in the annular cup.
 6. An apparatus according to claim 4, characterized in that the discontinuation of the rotation of the fruit is accomplished by a construction with the roller side of the cup being raised relatively to the remaining part of the cup.
 7. An apparatus according to one or more of the preceding claims, wherein a bloom orientation can be accomplished after orienting the centreline of the core, characterized in that the chain is stopped for a certain time and that the fruit is rotated about said core centreline before a colour camera by means of a separate servo drive and at least one friction wheel, said rotation being discontinued after the maximum colour intensity has been achieved.
 8. An apparatus according to claim 7, characterized in that each friction wheel is provided with a hollow.
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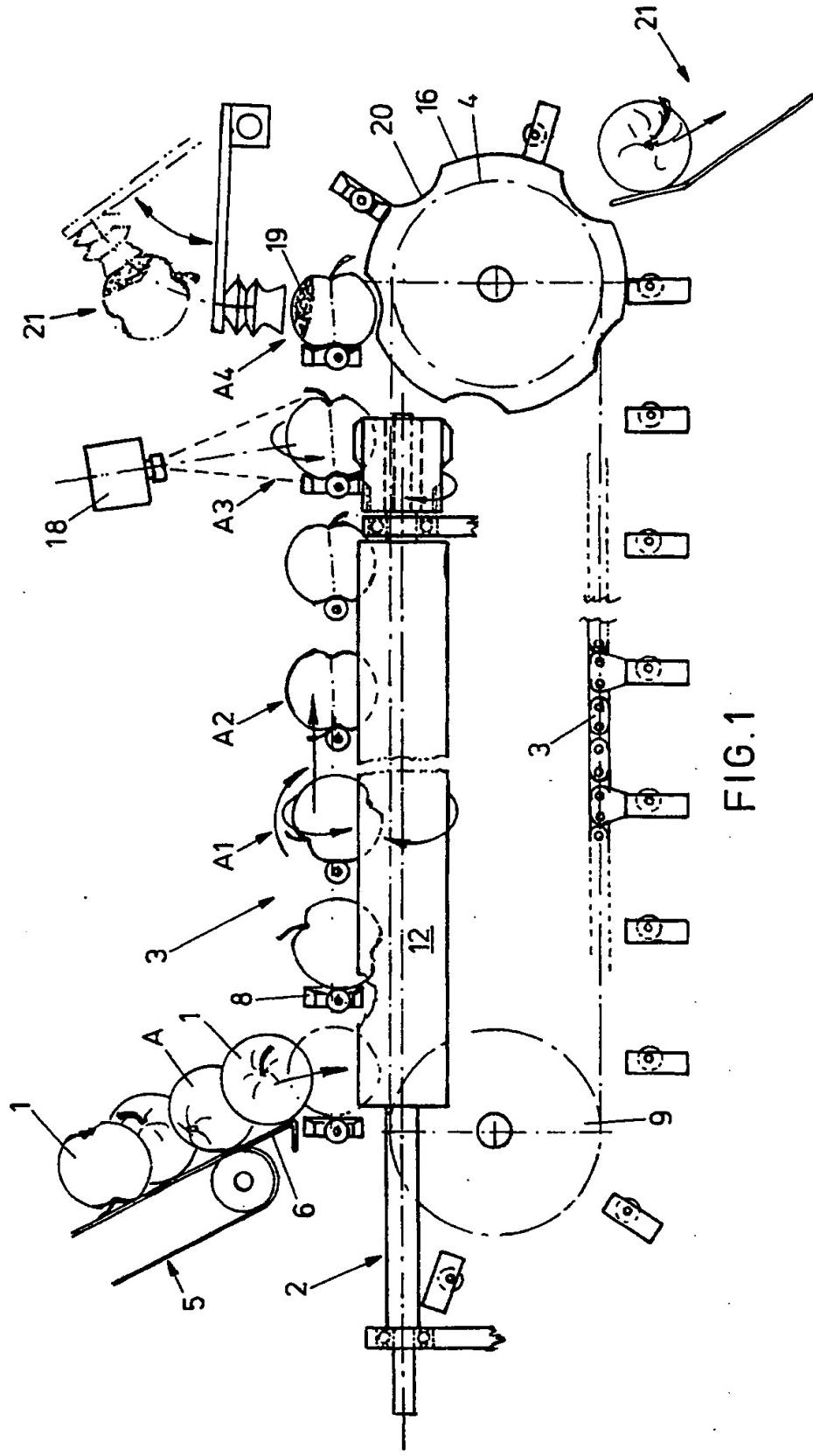


FIG. 1

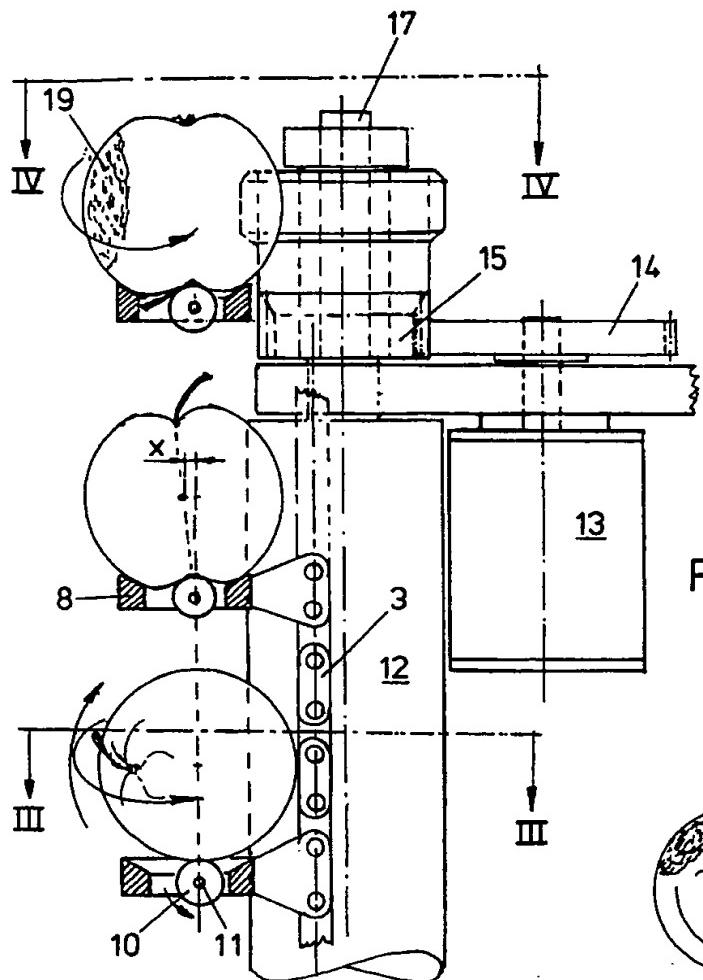


FIG. 2

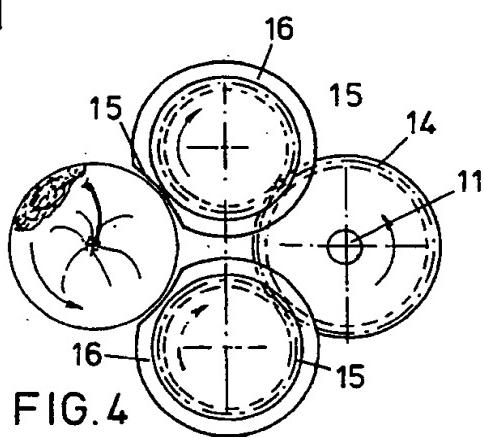


FIG. 4

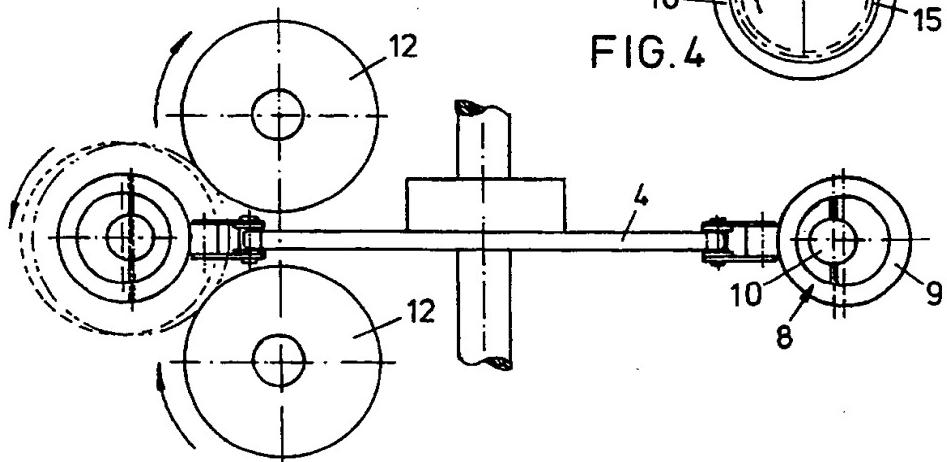


FIG. 3



EUROPEAN SEARCH
REPORT

EP 90 20 3220

DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)		
D,Y	EP-A-0 332 477 (SOCIETE MONTALBANAISE DE CONSTRUCTION MECANIQUE) * the whole document * - - -	1-3	B 65 B 35/58 A 23 N 3/00 B 65 G 47/24 B 65 G 19/30 B 07 C 5/342		
Y	US-A-4 171 042 (MEISSNER) * column 6, line 42 - column 7, line 25; figures 1-9 * - - -	1-3			
A	US-A-4 033 450 (PADDOCK ET AL.) * the whole document * - - -	1			
A	US-A-3 666 079 (ANDERSON ET AL.) * abstract; figures 4-7 * - - - -	1			
TECHNICAL FIELDS SEARCHED (Int. Cl.5)					
B 65 B A 23 N B 65 G B 07 C					
The present search report has been drawn up for all claims					
Place of search	Date of completion of search	Examiner			
The Hague	09 April 91	GYSEN L.A.D.			
CATEGORY OF CITED DOCUMENTS					
X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: Intermediate document T: theory or principle underlying the invention					
E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document					